UNH Researchers Work to Save Endangered New England Cottontail

Scientists Use DNA Analysis to Prevent Extinction of Only Native Rabbit in New Hampshire and Maine

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 Scientists with the NH Agricultural Experiment Station are working to restore New Hampshire and Maine's only native rabbit after new research based on genetic monitoring has found that in the last decade, cottontail populations in northern New England have become more isolated and seen a 50 percent contraction of their range.

The endangered New England cottontail is now is at risk of becoming extinct in the region, according to NH Agricultural Experiment Station researchers at the University of

New Hampshire College of Life Sciences and Agriculture who believe that restoring habitats is the key to saving the species.

“The New England cottontail is a species of great conservation concern in the Northeast. This is our only native rabbit and is an integral component of the native New England wildlife. Maintaining biodiversity gives resilience to our landscape and ecosystems,” said NHAES researcher Adrienne Kovach, research associate professor of natural resources at UNH.

New England cottontails have been declining for decades. However, NHAES researchers have found that in the last decade, the New England cottontail population in New Hampshire and Maine has contracted by 50 percent; a decade ago, cottontails were found as far north as Cumberland, Maine.

The majority of research on New England cottontails has come out of UNH, much of it under the leadership of John Litvaitis, professor of wildlife ecology, who has studied the New England cottontail for three decades. Kovach’s research expands on this knowledge by using DNA analysis to provide new information on the cottontail’s status, distribution, genetic diversity, and dispersal ecology.

The greatest threat and cause of the decline of the New England cottontail is the reduction and fragmentation of their habitat, Kovach said. Fragmentation of habitats occurs when the cottontail’s habitat is reduced or eliminated due to the maturing of forests or land development. Habitats also can become fragmented by roads or natural landscape features, such as bodies of water.

“Cottontails require thicketed habitats, which progress from old fields to young forests. Once you have a more mature forest, the cottontail habitat is reduced. A lot of other species rely on these thicket habitats, including bobcats, birds, and reptiles. Many thicket-dependent species are on decline, and the New England cottontail is a representative species for this kind of habitat and its conservation,” Kovach said.

Kovach explained that for cottontail and most animal populations to be healthy and grow, it is important for adult animals to leave the place where they were born and relocate to a new habitat, which is known as dispersal. There are two main benefits of dispersal: an animal is not competing with its relatives and dispersal minimizes inbreeding.

“We have found that it is increasingly difficult for Maine and New Hampshire cottontails to travel the large distances between fragmented habitats necessary to maintain gene flow among populations of cottontails,” Kovach said.

However, certain landscape features such as power line rights-of-way, railroad edges and roadsides may support rabbit dispersal as they provided the animal’s preferred scrub habitat. Occasionally, underpasses and culverts also may be effective conduits for rabbit travel. The researchers hope that an improved understanding of how the cottontail moves through the landscape will assist wildlife and land managers in species recovery efforts.

Researchers used genetics to study the changes in New England cottontail populations and their dispersal patterns. To obtain the DNA of the cottontails in this study, researchers collected the fecal pellets of 157 New England cottontails in southern Maine and seacoast New Hampshire during the winters of 2007-2008 and 2008-2009. Researchers believe this is the most exhaustive sampling effort in the area to date and likely documented nearly all currently occupied New England cottontail patches in Maine and seacoast New Hampshire.

Researchers identified the genetic pattern of individual rabbits and used information about genetic relatedness to make estimates of gene flow. They identified four major genetic clusters of New England cottontails in the region. A major power line connected some of these populations in the recent past – a finding which underscores the importance of restoring suitable habitat to reconnect these populations.

“If we can restore more of this habitat in our landscape and work on creating a landscape that has a mosaic of different habitats, including mature forests and young forests, we know that it is going to help a lot of species,” Kovach said.

This research, which was funded in part by the NH Agricultural Experiment Station, is presented in the article “A multistate analysis of gene flow for the New England cottontail, an imperiled habitat specialist in a fragmented landscape” in the journal *Ecology and Evolution*.

Founded in 1887, the NH Agricultural Experiment Station at theUNH College of Life Sciences and Agriculture is UNH’s original research center and an elemental component of New Hampshire's land-grant university heritage and mission. We steward federal and state funding to provide unbiased and objective research concerning diverse aspects of sustainable agriculture and foods, aquaculture, forest management, and related wildlife, natural resources and rural community topics. We maintain the Woodman and Kingman agronomy and horticultural farms, the Macfarlane Greenhouses, the Fairchild Dairy Teaching and Research Center, and the Organic Dairy Research Farm. Additional properties also provide forage, forests and woodlands in direct support to research, teaching, and outreach.

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